Competing Uses for a Constrained Feedstock Supply: Risks and Opportunities

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Stover harvest targets: Manage to erosion and organic matter targets

Stover is required to maintain soil quality

- Reduces wind erosion
- Reduces water erosion
- Provides organic matter to soil

Soil organic matter

- Enhances soil water and nutrient holding capacity
- Improves soil structure (less crusting, compaction and erosion)
- Promotes higher crop yields

Conservation planning tools (RUSLE2, WEPS, and SCI) have been used to estimate field-specific stover retention targets

- Andrews S (2006) Crop Residue Removal for Biomass Energy Production: Effects on Soils and Recommendations http://soils.usda.gov/sqi/management/files/agforum_residue_white_paper.pdf
- University of Nebraska Extension: Harvesting Crop Residues http://www.ianrpubs.unl.edu/epublic/pages/index.jsp?what=publicationD&publicationId=1026
- USDA NRCS (2010) Conservation practice standard 344: Residue management, Seasonal. ftp://ftp-fc.sc.egov.usda.gov/NHQ/practice-standards/standards/344.pdf
- USDA NRCS Soil Quality Institute (2003) Interpreting the Soil Conditioning Index: A Tool for Measuring Soil Organic Matter Trends. Technical Note No. 16 http://soils.usda.gov/SQI/management/files/sq_atn_16.pdf

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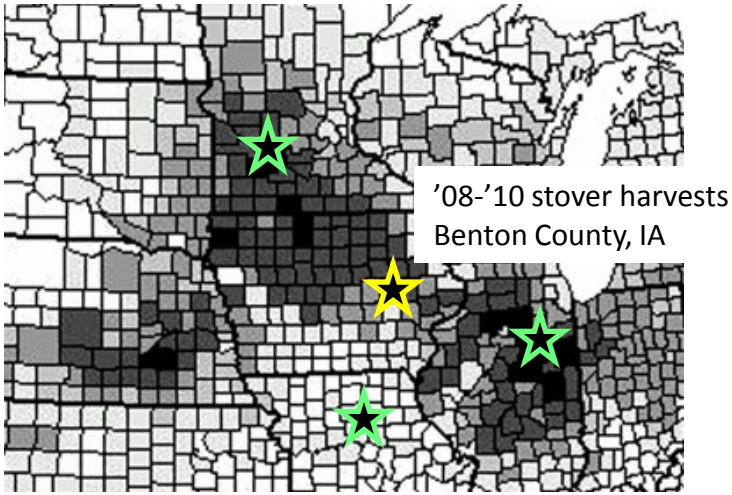
How much stover does a field need? It depends….

Harvestable corn stover



*Graham et al (2007) Agron J 99:1

Location specific factors

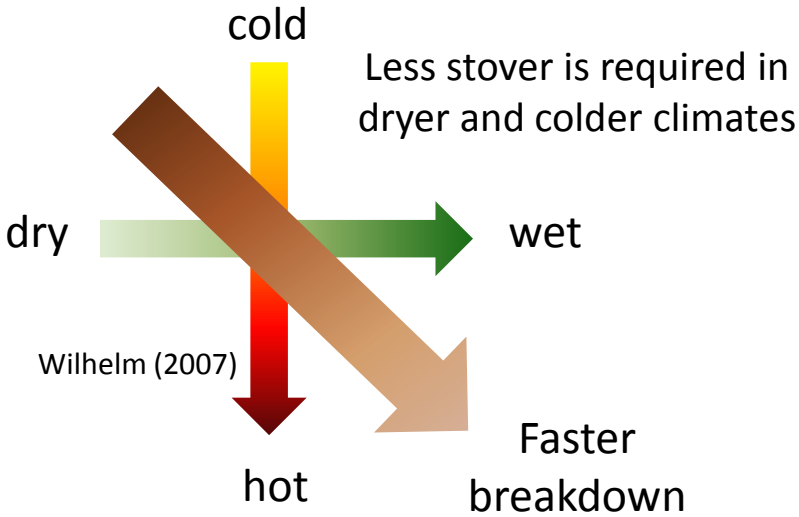
- Local weather (rainfall, temperatures, wind)
- Soil type
- Slope

Farmer controlled factors

- Organic inputs (crop yield and rotation)
- Farmer practice (tillage)

Benton county IA farm "moved" in RUSLE2

County	State	Soil requirement
Stearns	MN	2.0 dry tons/ac
Benton	IA	2.4 dry tons/ac
Christian	IL	2.8 dry tons/ac
Saline	MO	3.7 dry tons/ac



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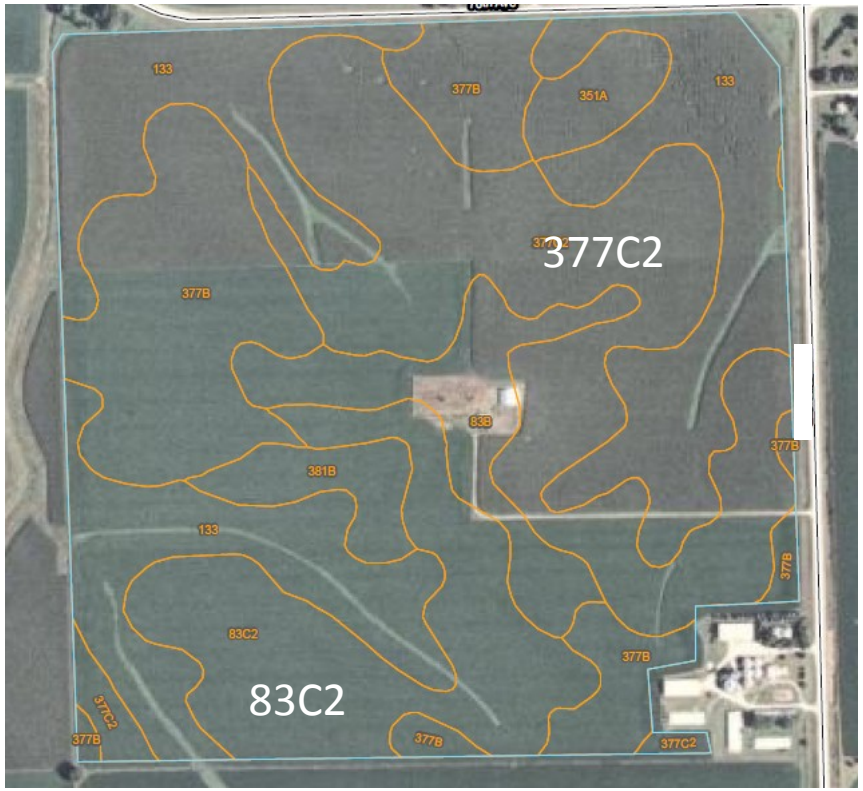
Partial harvests: Expand harvestable fields by avoiding slopes



Don's farm (145 ac), 40% of field is soil types with slopes between 5 and 9%

- Field average slope – 4.1%
- Avoiding slopes (soil types 83C2 and 377C2) decreases average slope to 2.1%
- Changes field stover requirement from 4.5 to 2.8 dry tons/ac
- Very challenging for rake operators, maps appear to overestimate steep area

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Cows eat about 10% of available stover in NE

Nebraska corn stalk grazing survey

301 respondents (164 ranchers, 289 corn farmers)

- 3.5 million ac of corn stalks grazed in winter 2010
  - 39-43% of acres
- Stocking rate 2.3 AUM/ha
  - 95% CI 1.9 to 2.8
- 1.3 million tons of corn stalks eaten by cattle in winter of 2010
- Total stover supply (INL) 11.2 million tons

http://dirtroadphotography.com

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Summary

Corn stover provides essential services to the field

- Erosion control
- Organic matter
- Nutrient recycling
- Moisture capture/retention

NRCS conservation planning tools can be used to assist in determining field-specific harvest rates

- Harvest rates will vary by field and location

Grazing is important in Nebraska

- Around 10% of harvestable stover is collected by cattle

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